

The Office Action maintains this rejection, which was originally made in the Office Action immediately preceding the current one, essentially repeating the previous Office Action's argument.

The Office Action summarizes applicants' prior arguments essentially accurately, stating that applicants' primary argument is that Daneman et al. does not disclose all the limitations of the claimed invention. Specifically, Daneman et al. does not disclose that the first and second angles of reflection combine in the same direction so that the combined angle is greater than either of the first or second angle about the specified axis. This is because the various MEMS devices of Daneman et al. that are coupled by an imaging system, e.g., to form an input or an output module, rotate about mutually orthogonal axes. Thus, the rotation of the coupled MEMS devices of Daneman et al. do not combine in the same direction, so that the combined angle is greater than either of the first or second angle about a specified axis.

This having been said, the Office Action states in response that it is clear that the Daneman et al. reference provides multiple MEMS device, where each has a plurality of mirrors, each of these mirrors being able to rotate about a single axis. It is also clear that the system of FIG. 4, having two MEMS devices, each containing a plurality of mirrors capable of rotating about a single axis, would be capable of producing a combined angle of reflection greater than either the first or second angle of reflection about a specified axis.

The Office Action's conclusion is incorrect.

There seems to a misunderstanding by the Office Action as to the meaning of orthogonal axes, and the ability of rotations about axes to combine, especially when the axes are orthogonal.

Simply put, rotations about orthogonal axes do not add.

For example, in a single device with the ability to rotate around two-orthogonal axes, lets suppose we start from a zero rotation about each axis and rotate 50 degrees about the first axis. The device now has a rotation about the first axis of 50 degrees, and it still has a rotation of zero degrees about the second axis. This can be thought of as (50, 0). Now we rotate the device 30 degrees about the second axis. The device now has a 30

degree rotation about the second axis and it still has the same 50 degree rotation about the first axis. This can be thought of as (50, 30). In other words, rotating about the second axis had absolutely no effect on the rotation about the first axis. The total rotation about the first axis remained the same. Effectively, rotating about the second axis added zero to the rotation about the first axis. This is because rotations about orthogonal axes do not combine. This is analogous to the operation of the system of Daneman et al., and it has been explicitly excluded by applicants' claim language which requires that neither of the angles of reflection of the grouped micro mirrors be zero.

By contrast, suppose we again start from a zero rotation about each axis and rotate 50 degrees about the first axis. The device now has a rotation about the first axis of 50 degrees, and it still has a rotation of zero degrees about the second axis. This can be thought of as (50, 0). Now we rotate the device again another 30 degrees about the first axis. The device now has an 80 degree rotation about the first axis and it still has the same 0 degree rotation about the second axis. This can be thought of as (80, 0). In other words, the rotations about the first axis have added to provide a new total rotation about the first axis. This is analogous to the operation of the applicants' invention as claimed.

Since the component of rotation about one axis does not contribute in any way to the component of rotation about the other axis, the Office Action's conclusion must be incorrect.

Given the foregoing, it is clear to applicants that the Office Action is attempting to add the angles of rotations of MEMS devices in Daneman et al. that cannot, and should not, be combined given the language of applicants' claims.

Firstly, the Office Action is not taking into proper account the effect of applicants' recited limitation that the angles of reflection of the MEMS devices that are combined **are combined about the first axis**. This is only possible when both of the angles of reflections are about the first axis. By contrast, in Daneman et al., the angles of reflections of each of the MEMS devices therein are about different axes. These Daneman et al. angles of reflection cannot be combined at all.

Secondly, it appears that the Office Action believes that the rotations of any of the MEMS devices disclosed by Daneman et al. can be added together. This is incorrect.

Only those MEMS device that are coupled by an imaging system between them can have their rotations about a single axis combined. Accordingly, in Daneman et al. a) only MEMS devices 212 may be combined with MEMS device 214 via the imaging system between them as a first group, and b) only MEMS devices 222 may be combined with MEMS device 224 via the imaging system between them as a second group. It therefore follows that MEMS device 212 cannot be combined with MEMS device 222 and that MEMS device 214 cannot be combined with MEMS device 224.

Given that the mirrors of MEMS devices 212 rotate about an axis that is mutually orthogonal to the axis about which the mirrors of MEMS device 214 rotate (see Daneman et al., column 4, lines 24-25), this grouping cannot have an effective rotation about any of its axes that is different than the rotation about that axis for the one of the MEMS device that is rotated only about that axis. Similarly, given that the mirrors of MEMS devices 222 rotate about an axis that is mutually orthogonal to the axis about which the mirrors of MEMS device 224 rotate (see Daneman et al., column 4, lines 27-28), this grouping cannot have an effective rotation about any of its axes that is different than the rotation about that axis for the one of the MEMS device that is rotated only about that axis.

Rejection Under 35 U.S.C. 103(a)

Claims 9, 10, 14, 28, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 6,330,102 issued to Daneman et al. on December 11, 2001.

This ground of rejection is for dependent claims only, and is predicated on the ability to maintain the rejection above under 35 U.S.C. 102(e) given Daneman et al. Since the rejection above under 35 U.S.C. 102(e) over Daneman et al. has been overcome, and the no additional elements are provided by Danemen et al. or suggested in the Office Action regarding the rejection under 35 U.S.C. 103(a), this ground of rejection cannot be maintained, because the rejected claims depend from independent claims which are allowable.

Therefore, claims 9, 10, 14, 28, and 29 are allowable over Daneman et al. under 35 U.S.C. 103(a).

Conclusion

It is respectfully submitted that the Office Action's rejections have been overcome and that this application is now in condition for allowance. Reconsideration and allowance are, therefore, respectfully solicited.

If, however, the Examiner still believes that there are unresolved issues, he is invited to call applicant's attorney so that arrangements may be made to discuss and resolve any such issues.

In the event that an extension of time is required for this amendment to be considered timely, and a petition therefor does not otherwise accompany this amendment, any necessary extension of time is hereby petitioned for, and the Commissioner is authorized to charge the appropriate cost of such petition to the **Lucent Technologies Deposit Account No. 12-2325**.

Respectfully,

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